CITY OF PICABO (PWS 5070041)
SOURCE WATER ASSESSMENT FINAL REPORT

December 12, 2000

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for the City of Picabo, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Picabo drinking water system consists of one well. Due to a moderate rating in hydrologic sensitivity and moderate system construction score, the well ranks as moderate susceptibility to inorganic contamination, volatile organic contamination, synthetic organic contamination, and microbial contaminants. Total coliform bacteria, fecal coliform bacteria, and E-coli bacteria have been detected occasionally in the past 5 years, but the system's gaseous chlorine disinfection system has corrected the problems when they occur. The delineation capture zone includes Highway 20 and the Picabo Air Strip.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Picabo, source water protection activities should focus on maintaining compliance with current wellhead standards. Disinfection practices should be maintained to reduce the risk of microbial contamination. The City of Picabo water system should also be aware of potential risks due to inorganic contaminants from agricultural practices. Source water protection activities should also focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water area. Some of the designated areas are outside the direct jurisdiction of the City of Picabo. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of groundwater, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and local Soil Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF PICABO, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (IDEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. IDEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Picabo water system serves a community of approximately 50 people with 29 connections, located in Blaine County, west of the City of Carey, near Silver Creek, along Highway 20 (Figure 1). The public drinking water system for City of Picabo is comprised of one well.

The primary water quality issue currently facing City of Picabo is that of microbial contamination and possible leaching of inorganic chemical (IOC) contamination from the local agricultural activities and the problems associated with managing this contamination. In recent years, total coliform bacteria, fecal coliform bacteria, and E-coli bacteria have been detected at various sampling locations in the Picabo area including the Pump House, the Office tap, and the storage tank building. No (IOC) (i.e. nitrate) has been recorded above the Maximum Contaminant Level (MCL). Volatile organic contaminants (VOCs) and synthetic organic contaminants (SOCs) have never been detected in any of the drinking water.

Defining the Zones of Contribution--Delineation

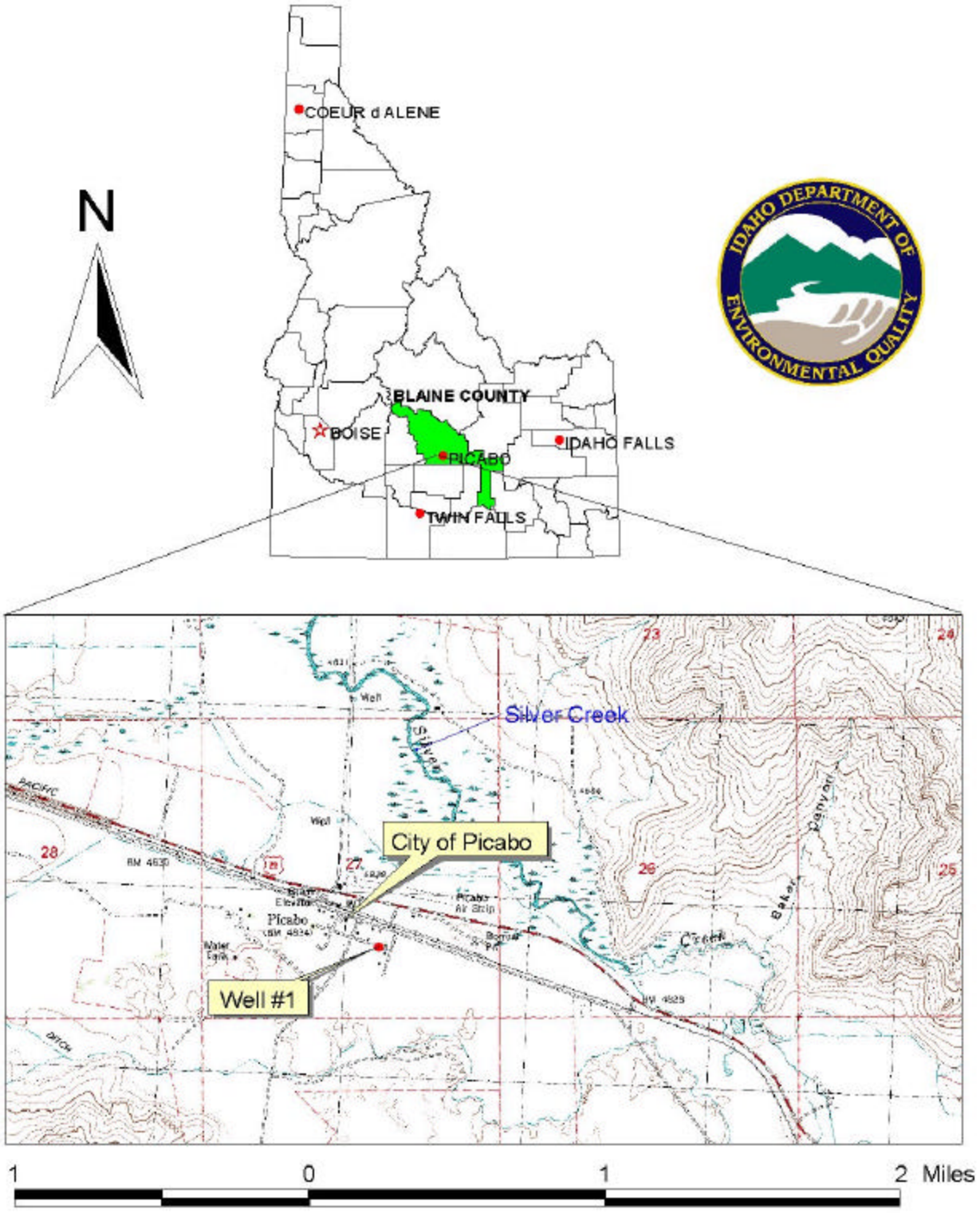
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. IDEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel for water associated with the Silver Creek aquifer in the vicinity of the City of Picabo. The computer model used site specific data, assimilated by IDEQ from a variety of sources including the local well logs and various reports (Brockway and Kahlown, 1994; Castelin and Winner, 1975; Frenzel, 1989). The City of Picabo well delineation can best be described as a corridor ½ mile wide and about 1 mile long extending to the west. The actual data used by IDEQ in determining the source water assessment delineation area is available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by IDEQ and from available databases.

The dominant land use outside the City of Picabo is irrigated and undetermined agriculture. Land use within the immediate area of the well is residential and small business.

Figure 1. Geographic Location of the City of Picabo Well



It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during the spring and summer of 2000. The first phase involved identifying and documenting potential contaminant sources within the City of Picabo Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by IDEQ. The second or enhanced phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Nick Purdy.

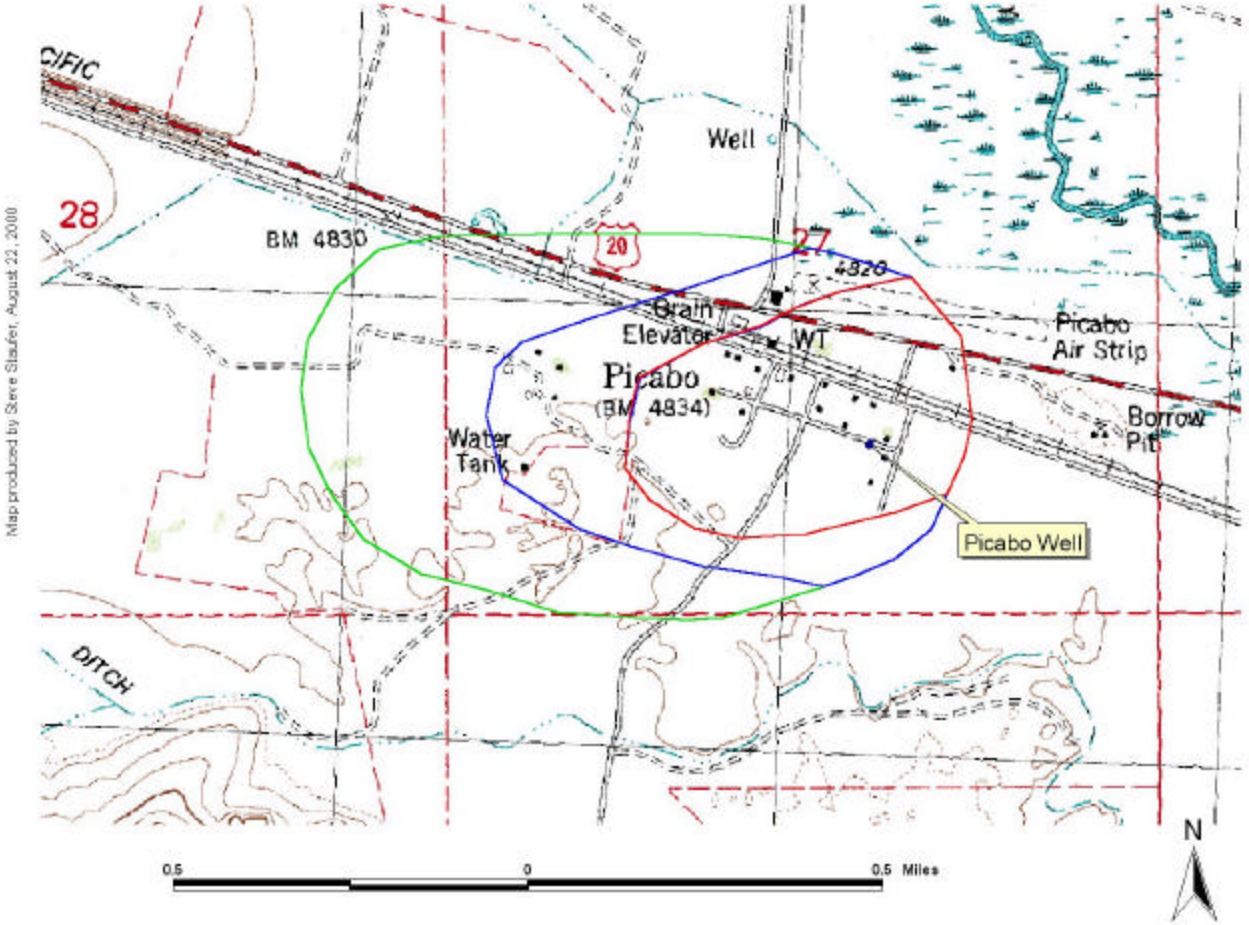
Two potential contaminant sites are located within the delineated source water areas (see Table 1, Figure 2). Highway 20 and the Picabo Air Strip are potential locations for accidental spills that could add IOCs, VOCs, SOCs, or microbial contaminants to the groundwater system. Both could offer pathways for contaminants in the future because of the make-up of the soils in the area.

Table 1. City of Picabo, Potential Contaminant Inventory

Source Description	TOT Zone (years)	Source of Information	Potential Contaminants
Highway 20	0-10	Database Search	IOC, VOC, SOC, Microbials
Picabo Air Strip	0-3	Database Search	VOC, SOC

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Figure 2. City of Picabo Drinking Water Time of Travel Capture Zones and Enhanced Potential Contaminant Sources



Map produced by Steve Staufer, August 22, 2000

Legend

- Wellhead
- Enhanced Inventory
- Toxic Release Inventory
- CERCLIS Site
- Business Mailing List
- Dairy
- NPDES Site
- RICRIS Site
- LUST Site
- Injection Well
- Group1 Site
- Recharge Point
- SARA Title III Site (EPCRA)
- Cyanide Site
- AST
- Landfill
- Wastewater Land App.Site
- Mine

UST Site
- Closed
- Open

Time of Travel Zones
- 0-3 Year Time Travel
- 3-6 Year Time of Travel
- 6-10 Year Time of Travel

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was moderate for the City of Picabo well (see Table 2). This rating is indicative of the soils being considered well drained and having predominantly a gravel or fractured rock vadose zone (zone from land surface to the water table). Both of these factors increase the risk of downward movement of contaminants from the surface to the aquifer. Reducing the sensitivity score is the presence of low permeability clay layers totaling approximately 50 feet which will reduce the downward movement of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The City of Picabo drinking water system consists of one well that extracts groundwater for domestic and commercial uses. The well system construction score was moderate for the City of Picabo well (Table 2). A 1995 Drinking Water Supply Report showed that the City of Picabo well was in substantial compliance with well seal and flood protection standards. No well log was available to determine if the well was constructed in a manner consistent with current public water system (PWS) construction standards.

The Idaho Department of Water Resources Well Construction Standards Rules (1993) require all PWSs to follow IDEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the Recommended Standards for Water Works (1997) during construction. Table 1 of the Recommended Standards for Water Works (1997) states that 6-inch casing requires a thickness of 0.288 inches and 8-inch casing requires a thickness of 0.322 inches. The casing and annular seal of a PWS well must both be installed into low permeability units to protect the groundwater source. Additionally, Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last "24 hours or until stabilized drawdown has continued for six hours at 1.5 times" the design pumping rate.

Based on nearby well logs and previous studies of the area (Castelin and Winner, 1975; Frenzel, 1989; Brockway and Kahlown, 1994), the city well is most likely completed in sedimentary (river and glacier deposited) interbeds deposited between layers of basalt (lava rock).

Potential Contaminant Source and Land Use

The City of Picabo well rates on the high end of moderate for inorganic chemicals (IOCs) (i.e. nitrate), volatile organic chemicals (VOCs) (i.e. petroleum products), and synthetic organic chemicals (SOCs) (i.e. pesticides). The well rates low for microbial contaminants. The largest number of points for the well came from the irrigated agricultural land of the area. Additional points were given for Highway 20 and the Picabo Air Strip. These sources could potentially contribute IOC, VOC, SOC, and microbial contaminants to the well.

Final Susceptibility Ranking

A detection above a drinking water standard Maximum Contaminant Level (MCL) or a detection of total coliform bacteria, fecal coliform bacteria, or E-coli bacteria will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Well #1 water chemistry tests have detected the presence of total coliform bacteria, fecal coliform bacteria, and E-coli bacteria. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking. In this case, the well automatically rates high for microbial contamination. In terms of total susceptibility rating, the City of Picabo well rated moderate for all other types of contaminants.

Table 2. Summary of City of Picabo Susceptibility Evaluation

Well	Susceptibility Scores									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	M	M	L	M	M	M	M	H*

H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Indicates source automatically scored as high susceptibility due to presence of total coliform bacteria, fecal coliform bacteria, or E-coli bacteria in the finished drinking water.

Susceptibility Summary

Total coliform bacteria, fecal coliform bacteria, or E-coli bacteria possibly threaten the City of Picabo drinking water system. The City of Picabo should also be aware of the possible IOC contaminants that exist due to the agricultural uses of the land.

The well in the City of Picabo system probably takes water from the alluvial (river deposited) material between the layers of basalt that make up the valley floor or from the confined basalt aquifer. The alluvial deposits consist of clay, silt, sand, and gravel that vary in thickness. Basalt of the Challis volcanics is encountered at depths as shallow as 5 feet below ground surface. The groundwater is found between 20 feet below ground surface and 100 feet below ground surface depending on whether the well is drilled into the alluvial material or the deeper, confined basalt aquifer. Recharge is primarily from precipitation, snowmelt, and irrigation return flow. (Brockway and Kahlown, 1994).

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the City of Picabo, source water protection activities should focus on maintaining compliance with current wellhead standards. Disinfection practices should be maintained to reduce the risk of microbial contamination. The City of Picabo water system should also be aware of potential risks due to inorganic contaminants from agricultural practices. Source water protection activities should also focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water area. Agricultural activities are currently the major land use, and the highly permeable nature of the soils and the movement rates of the water through the aquifer make agricultural chemical leaching a concern. The City of Picabo should consider implementing practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the delineated source water areas.

Some of the delineated areas are outside the direct jurisdiction of City of Picabo. Partnerships with state and local agricultural agencies, county elected officials, and industry groups should be established and are critical to success. Due to the time involved with the movement of groundwater, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and local Soil Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water supplies and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Twin Falls Regional IDEQ Office (208) 736-2190

State IDEQ Office (208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 743-6142 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as "Superfund" is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Anderson, J.E. and K. Bideganeta. 1985. "A Preliminary Geologic Reconnaissance of the Geothermal Occurrences of the Wood River Drainage Area." Water Information Bulletin No. 30. Idaho Department of Water Resources. 49 pages.

Brockway, C.E. and M.A. Kahlown. 1994. "Hydrologic Evaluation of the Big Wood River – Silver Creek Watersheds." Idaho Water Resources Research Institute. 77 pages.

Castelin, P.M. and J.E. Winner. 1975. "Effects of Urbanization on the Water Resources of the Sun Valley-Ketchum Area, Blaine County, Idaho." Water Information Bulletin No. 40. Idaho Department of Water Resources. 86 pages.

Frenzel, S.A. 1989. "Water Resources of the Upper Big Wood River Basin, Idaho." U.S. Geological Survey. Water-Resources Investigations Report 89-4018. 47 pages.

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Idaho Department of Environmental Quality. 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

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Luttrell, S.P. and C.E. Brockway. 1982. "Impacts of Individual On-Site Sewage Disposal Facilities on Mountain Valleys – Phase I. Research Technical Completion Report A-084-IDA. Idaho Water and Energy Resources Research Institute. University of Idaho. 52 pages.

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Attachment A

City of Picabo
Susceptibility Analysis
Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : PICABO CITY OF Well# : WELL #1

Public Water System Number 5070041 09/25/2000 9:51:32 AM

1. System Construction		SCORE
Drill Date		
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1995
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
	Total Hydrologic Score	4

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	2	2	1
(Score = # Sources X 2) 8 Points Maximum		2	4	4	2
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		10	8	8	6

Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	4	4	0

Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	

Total Potential Contaminant Source / Land Use Score - Zone III	3	2	2	0
Cumulative Potential Contaminant / Land Use Score	20	16	16	8
4. Final Susceptibility Source Score	12	11	11	11
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate